AMENDMENTS TO THE CLAIMS

The text of all pending claims, including withdrawn claims, is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 3, 4, 7, 13, and 14 to read as follows:

1. (ORIGINAL) An orthogonal frequency division multiplexing (OFDM)-based synchronization detection apparatus, comprising:

a 2^n level quantizing unit quantizing received data samples into levels of 2^n, where n is an integer greater than or equal to zero (0);

a delaying unit delaying the data samples quantized through the 2^n level quantizing unit by a predetermined number of clocks and outputting data indicative thereof;

a shifting unit shifting the output data samples of the 2^n level quantizing unit by an amount corresponding to an exponent of the output data of the delaying unit; and

a peak detecting unit detecting a peak value from sums of outputs from the shifting unit.

2. (ORIGINAL) The OFDM-based synchronization detection apparatus according to claim 1, wherein the 2^n level quantizing unit proportionally magnifies the received data samples by values of 2^n, and converges the proportionally magnified data samples to 2^m levels, where m = 0, 1, 2, ... n.

3. (CURRENTLY AMENDED) The OFDM-based synchronization detection apparatus according to claim 2, wherein the proportional magnification of the received data samples comprises scaling of samples $r(k)$ to obtain scaled samples x in accordance with the following equation:

$$x = \frac{2^n r(k)}{\max r(k)}.$$

4. (CURRENTLY AMENDED) The OFDM-based synchronization detection apparatus according to claim 3, wherein ~~a~~the convergence comprises converging the scaled samples x in accordance with the following equation:

$$Q_L(x) \cong \begin{cases} 2^{[\log_2 x]}, & x > 0 \\ 0, & x = 0 \end{cases}$$

where $[\log_2 x]$ is an integer mostly approximate to $\log_2 x$.

5. (ORIGINAL) An orthogonal frequency division multiplexing (OFDM)-based synchronization detection method, comprising :

quantizing received data samples into levels of 2^n ;

delaying the quantized data samples by a predetermined numbers of clocks;

shifting the quantized data samples by an amount corresponding to an exponent of the delayed data and outputting shifting results indicative thereof; and

detecting synchronization using the shifted results.

6. (ORIGINAL) The OFDM-based synchronization detection method according to claim 5, wherein the quantization comprises:

proportionally magnifying coefficients by values of 2^n, and converging the proportionally magnified coefficients to levels of 2^m, where m = 0, 1, 2 ... n.

7. (CURRENTLY AMENDED) The OFDM-based synchronization detection method according to claim 6, wherein the proportional magnification comprises:

scaling the samples $r(k)$ to yield scaled samples x in accordance with the following equation:

$$x = \frac{2^n r(k)}{\max r(k)} \div$$

8. (ORIGINAL) The OFDM based synchronization detection method according to claim 7, wherein the convergence comprises:

converging the scaled samples x in accordance with the following equation:

$$Q_L(x) \cong \begin{cases} 2^{[\log_2 x]}, & x > 0 \\ 0, & x = 0 \end{cases}$$

where $[\log_2 x]$ is an integer mostly approximate to $\log_2 x$.

9. (ORIGINAL) An orthogonal frequency division multiplexing (OFDM)-based synchronization detection apparatus, comprising:

a 2^n level quantizing unit quantizing received data samples into levels of 2^n;

a delaying unit delaying the quantized data samples by a predetermined number of clocks;

a complex conjugate extracting unit extracting complex conjugates of the delayed quantized data samples;

an n-bit shifting unit shifting quantized outputs q(k) from the 2^n level quantizing unit by an amount corresponding to a value of extracted complex conjugates;

an integer extracting unit extracting integer parts from the shifted quantized outputs q(k) and outputting L outputs indicative thereof;

a moving sum calculating unit summing up consecutively the L outputs at every clock; and

a peak detecting unit detecting a maximum value among the summing up of the consecutive L outputs to determine a synchronization of timing.

10. (ORIGINAL) The OFDM-based synchronization detection apparatus according to claim 9, wherein the 2^n level quantizing unit quantizes the received data samples into a maximum of 2^n levels.

11. (ORIGINAL) The OFDM-based synchronization detection apparatus according to claim 10, wherein the quantized 2^n levels are defined as quantizing data levels of exponents of 2.

12. (ORIGINAL) The OFDM-based synchronization detection apparatus according to claim 9, wherein the quantized outputs $q(k)$ are represented by a quantization function Q_L, where a sample $\max r(k)$ having a largest value among the samples $r(k)$ is 2^n, and other samples $r(k)$ are proportionally magnified or scaled, as follows:

$$q(k) = Q_L\left[\frac{2^n r(k)}{\max r(k)}\right].$$

13. (CURRENTLY AMENDED) The OFDM-based synchronization detection apparatus according to claim 12, wherein $Q_L[x]$ represents a complex quantization to quantize the scaled samples $r(k)$ into levels of 2^i in accordance with the following equation:

$$Q_L[x] \cong Q[\mathrm{Re}\{x\}] + jQ[\mathrm{Im}\{x\}] \quad .$$

14. (CURRENTLY AMENDMENT) The OFDM-based synchronization detection apparatus according to claim 12, wherein $Q_L[x]$ represents a complex quantization to quantize the scaled samples $r(k)$ into levels of 2^i in accordance with the following equation:

$$Q_L(x) \cong \begin{cases} 2^{[\log_2 x]}, & x > 0 \\ 0, & x = 0 \end{cases} \quad .$$

15. (ORIGINAL) The OFDM-based synchronization detection apparatus according to claim 12, wherein the moving sum calculating unit calculates correlation values according to the following equation:

$$\Lambda(n) = \sum_{k=1}^{n+L} \{q(k) << l(k-N)\}$$

$$l(k-N) = \log_2 q^*(k-N)$$

where the term $q(k) << l(k-N)$ represents a shift of the quantized value $q(k)$ to the left bit location by $l(k-N)$ bits, and $l(k-N) = \log_2 q^*(k-N)$ represents a transformation of the quantized 2^n level samples $q^*(k-N)$ into the values of $l(k-N)$, which are values of exponents extracted from the 2^n level quantized samples.